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EXAMINER

NAHAR, QAMRUN

ART UNIT	PAPER NUMBER
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2124

DATE MAILED: 01/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/503,215

Applicant(s)

NIEWIADOMSKI ET AL.

Examiner

Qamrun Nahar

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3. 6) ☐ Other: _____

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DETAILED ACTION

1. Claims 1-40 have been examined.

Oath/Declaration

2. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because domestic priority under 35 U.S.C. § 119(e) (to a provisional application, 60/116,437) has not been claimed.

Specification

3. The abstract of the disclosure is objected to because it is more than 150 words.

Correction is required. See MPEP § 608.01(b).

4. The abstract of the disclosure is objected to because it contains an incomplete sentence, "STUB for imported function", on page 39, line 14. Correction is required. See MPEP § 608.01(b).

5. The disclosure is objected to because of the following informalities: there is no section labeled "Cross-Reference to Related Applications" claiming domestic priority under 35 U.S.C. § 119(e) (to a provisional application, 60/116,437).

Appropriate correction is required.

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Claim Objections

6. Claim 22 is objected to because of the following informalities: claim 22 depends on itself. Claim 22 is interpreted as depending on independent claim 21. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 9-10, 21 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 recites the limitation "the function" on page 30, line 17. It is indefinite as to which function the limitation is referring to. This limitation is interpreted as "the original function".

Claim 10 is rejected for dependency on the above rejected claim 9.

Claim 21 recites the limitation "and instruction" on page 33, line 13. This limitation is interpreted as "an instruction".

Claim 22 is rejected for dependency on the above rejected claim 21.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-16, 18-20, and 27-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Fortin (U.S. 5,528,753).

Per Claim 1:

The Fortin patent discloses:

- **a computerized method for creating an instrumented executable file** (“provide a system and method for efficiently instrumenting stripped object routines executing on a computer system” in column 3, lines 19-21)

- **redirecting an original function in an executable file to a user-supplied function** (“The Call to Target still points to address 202. After 202, however, control is passed to Entry Routine 210. Entry Routine 210 collects the information desired by the monitor and returns control to the target routine.” in column 4, lines 47-51)

- **retaining access information of the original function** (“The Call to Target still points to address 202 ... returns control to the target routine.” in column 4, lines 47-51).

Per Claim 2:

The Fortin patent discloses:

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- the user-supplied function is modified to invoke the original function using the retained access information of the original function (column 4, lines 49-53).

Per Claim 3:

The Fortin patent discloses:

- the user-supplied function is in a dynamic linked library (column 5, lines 20-24).

Per Claim 4:

The Fortin patent discloses:

- the user-supplied function is not exported during compilation (column 5, lines 20-24).

Per Claim 5:

The Fortin patent discloses:

- the original function and the user-supplied function have identical prototypes (column 4, lines 62-65).

Per Claim 6:

The Fortin patent discloses:

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- the user-supplied function is stored in a module that is separate from the executable file (column 5, lines 20-24).

Per Claim 7:

The Fortin patent discloses:

- the redirecting further comprises modifying the executable file (column 4, lines 62-65).

Per Claim 8:

The Fortin patent discloses:

- determining whether the original function implements the thiscall calling convention, and when the determination is positive, adding instructions to the executable file to perform pushing the register that holds the “this” pointer onto the stack from the invoked original function site when the determining indicates that the function implements a thiscall calling convention (column 5, lines 48-51 and lines 55-57, and column 6, lines 48-58)

- swapping the return value of the invoking original function on the stack and the register that holds the “this” pointer value on the stack when the determining indicates that the function implements a thiscall calling convention (column 6, lines 59-67).

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Per Claim 9 (as best understood):

The Fortin patent discloses:

- **modifying the executable file further comprises enabling the user-supplied function to invoke the original function in the executable file (column 4, lines 49-53).**

Per Claim 10 (as best understood):

The Fortin patent discloses:

- **adding a jump in the user-supplied function to a function that retrieves the address of the original function (column 6, lines 6-18)**
- **adding a jump in the user-supplied function that invokes the original function using the address of the original function (column 6, lines 1-5 and lines 35-39).**

Per Claim 11:

The Fortin patent discloses:

- **enabling the user-supplied function to alter behavior (column 4, lines 47-53).**

Per Claim 12:

The Fortin patent discloses:

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- enabling the user-supplied function to alter behavior is performed in response to data (column 4, lines 47-53).

Per Claim 13:

The Fortin patent discloses:

- the data is retrieved from an initialization file ("libinstr.a" in Fig. 7 and column 5, lines 20-24).

Per Claim 14:

The Fortin patent discloses:

- saving the address of an original function in a threaded local storage variable (column 6, lines 1-5)

- creating an entry in a function lookup table associating the address of the original function with the name of the original function, wherein the function lookup table is in the instrumented executable file (column 5, lines 46-51 and lines 64-67).

Per Claim 15:

The Fortin patent discloses:

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- **a computerized method for executing an instrumented executable file** (“provide a system and method for efficiently instrumenting stripped object routines executing on a computer system” in column 3, lines 19-21)

- **the instrumented executable file having an original function redirected to a user-supplied function** (“The Call to Target still points to address 202. After 202, however, control is passed to Entry Routine 210. Entry Routine 210 collects the information desired by the monitor and returns control to the target routine.” in column 4, lines 47-51)

- **the user-supplied function having a jump to the original function** (“The stored target routine first instruction is executed in the ‘Return to Target’ section and control branches to the second instruction of the target routine 714.” in column 6, lines 56-58)

- **saving the address of the original function in a threaded local storage variable** (“The ‘Return to Target Routine’ section 604 contains the ‘saved’ first instruction of the target routine and direct branch to the address of the second instruction of the target routine.” in column 6, lines 1-5)

- **invoking the user-supplied function** (“Processing begins with a call to the target routine 702. This call will encounter the branch first instruction and immediately branch to the Entry section 704 ... that in turn calls 708 user supplied Entry routine” in column 6, lines 46-51).

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Per Claim 16:

The Fortin patent discloses:

- **creating a master lookup table at initialization wherein the master lookup table associates the base address of the instrumented executable file to the address of a function lookup table in the instrumented executable file (column 5, lines 47-51 and lines 55-67).**

Per Claim 18:

The Fortin patent discloses:

- **wherein original function is embedded in the instrumented executable file, and wherein the saving and the invoking is performed by the original function (column 6, lines 46-51).**

Per Claim 19:

The Fortin patent discloses:

- **invoking the original function from within the user-supplied function using the threaded local storage variable (column 6, lines 56-58).**

Per Claim 20:

The Fortin patent discloses:

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- **pushing the register that holds the “this” pointer onto the stack from the invoked original function site when the determining indicates that the function implements a thiscall calling convention** (column 5, lines 48-51 and lines 55-57, and column 6, lines 48-58)

- **swapping the return value of the invoking original function on the stack and the register that holds the “this” pointer value on the stack when the determining indicates that the function implements a thiscall calling convention** (column 6, lines 59-67).

Per Claim 27:

The Fortin patent discloses:

- **a computerized method for publishing a function** (“provide a system and method for efficiently instrumenting stripped object routines executing on a computer system” in column 3, lines 19-21)

- **adding an entry describing the function in a function lookup table in a machine-readable executable file** (“insertion of the demultiplexor entries 510. A demultiplexor entry (demux-entry) is provided for each target routine.” in column 5, lines 46-51 and lines 64-67).

Per Claim 28:

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This is a system version of the claimed method discussed above, claim 1, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above.

Thus, accordingly, this claim also would have been anticipated by Fortin.

Per Claim 29:

This is a system version of the claimed method discussed above (claims 1 and 2), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above, including “the original function having an identity comprising a name and a parameter prototype” (column 4, lines 62-65 and column 5, lines 64-67). Thus, accordingly, this claim also would have been anticipated by Fortin.

Per Claim 30:

The Fortin patent discloses:

- **a computerized system** (“provide a system and method for efficiently instrumenting stripped object routines executing on a computer system” in column 3, lines 19-21)
- **an executable file having a jump to an original function, the original function having an identity comprising a name and a parameter prototype** (“The stored target routine first instruction is executed in the “Return to Target” section and control branches to the second instruction of the target routine 714.” in column 5, lines 64-67 to column 6, lines 1-5 and lines 56-58)

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- **a first software component having a user-supplied function that includes a jump to the original function** ("The Entry routine saves ... and calls 706 the common Entry code that in turn calls 708 user supplied Entry routine ... The stored target routine first instruction is executed in the "Return to Target" section and control branches to the second instruction of the target routine 714." in column 5, lines 64-67 to column 6, lines 1-5 and lines 48-58)
- **a second software component for receiving the identity of the original function, receiving the identity of the user-supplied function, instrumenting the function in the executable file using the identity of the user-supplied function** ("The routines also allow the function of a target routine to be fully replaced such that newly provided code will be executed instead of the base code in the routine being monitored." in column 4, lines 62-65)
- **storing the original function address in the executable file in association with the name of the original instrumented function** ("insertion of the demultiplexor entries 510. A demultiplexor entry (demux-entry) is provided for each target routine ... The data section 602 contains the addresses at which the target routine and the target routine's symbolic name reside" in column 5, lines 46-51 and lines 64-67).

Per Claim 31:

The Fortin patent discloses:

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- **a computerized system** ("provide a system and method for efficiently instrumenting stripped object routines executing on a computer system" in column 3, lines 19-21)

- **a first module of machine-readable code comprising a first instrumented function call to a first replacement function** ("The Call to Target still points to address 202. After 202, however, control is passed to Entry Routine 210. Entry Routine 210 collects the information desired by the monitor and returns control to the target routine." in column 4, lines 47-51)

- **a first data structure associating the identity of the first instrumented function with the location of the first instrumented function** ("A demultiplexor entry (demux-entry) is provided for each target routine ... The data section 602 contains the addresses at which the target routine and the target routine's symbolic name reside" in column 5, lines 46-51 and lines 64-67)

- **a second module comprising the first replacement function, operatively coupled to the first module through a jump to the first original function** ("The stored target routine first instruction is executed in the 'Return to Target' section and control branches to the second instruction of the target routine 714." in column 6, lines 56-58).

Per Claim 32:

The Fortin patent discloses:

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- the first data structure comprises a function lookup table readily available for verifying that the threaded local storage variable contains the correct original instrumented function address (column 5, lines 64-67 to column 6, lines 1-5)

- the second module comprises a dynamic linked library (column 5, lines 20-24).

Per Claim 33:

The Fortin patent discloses:

- a second data structure associating the location of the first data structure with the location of the first module (column 5, lines 47-51 and lines 55-67).

Per Claim 34:

The Fortin patent discloses:

- a third module of machine-readable code comprising a second instrumented function call to a second replacement function (column 4, lines 47-51 and column 5, lines 48-49, one or more instrumented functions)

- a second data structure associating the identity of the second instrumented function with the location of the second instrumented function (column 5, lines 55-67)

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- a fourth module comprising the second replacement function, having a jump to the second original function (column 6, lines 56-58).

Per Claim 35:

The Fortin patent discloses:

- a third module of machine-readable code comprising a second instrumented function jump to a second replacement function (column 6, lines 59-67 and column 5, lines 48-49, one or more instrumented functions)
- a second data structure associating the identity of the second instrumented function with the location of the second instrumented function (column 5, lines 55-67)
- the second module further comprises the second replacement function, having a jump to the second original function (column 6, lines 56-58).

Per Claim 36:

This is a computer-readable medium version of the claimed method discussed above, claim 1, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim also would have been anticipated by Fortin.

Per Claim 37:

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This is a computer-readable medium version of the claimed system discussed above (claims 31 and 33), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim also would have been anticipated by Fortin.

Per Claims 38-39:

This is a computer-readable medium version of the claimed system discussed above (claims 31-32, respectively), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim also would have been anticipated by Fortin.

Per Claim 40:

This is a computer-readable medium version of the claimed system discussed above, claim 32, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim also would have been anticipated by Fortin.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fortin (U.S. 5,528,753).

Per Claim 17:

The rejection of claim 15 is incorporated, and Fortin teaches that the saving and the invoking are performed by the original function, and the original function being located in the instrumented executable file (column 6, lines 44-51). Fortin does not explicitly teach that the original function is in a dynamic link library and a stub function of the original function being located in the instrumented executable file. Official Notice is taken that it was a common practice to include a function in a dynamic link library at the time the instant invention was made.

It would have been obvious to one having ordinary skill in the computer art at the time of the invention was made to modify the method disclosed by Fortin to include a function in a dynamic link library using the teaching of common practice. The modification would be obvious because one of ordinary skill in the art would be motivated to eliminate recompilation of a file, save memory space, and one would also want to provide the ease of modifying functions.

13. Claims 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fortin (U.S. 5,528,753), and further in view of Peek (U.S. 5,481,706).

Per Claims 21-22 (as best understood):

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Fortin teaches a computerized method for instrumenting an original function in an executable file for testing by callers of the original function (“provide a system and method for efficiently instrumenting stripped object routines executing on a computer system” in column 3, lines 19-21), the original function comprises an instruction that saves the original function address to a threaded local storage variable (“The ‘Return to Target Routine’ section 604 contains the ‘saved’ first instruction of the target routine and direct branch to the address of the second instruction of the target routine.” in column 6, lines 1-5), an instruction that causes a jump to the user-supplied function (“Processing begins with a call to the target routine 702. This call will encounter the branch first instruction and immediately branch to the Entry section 704 ... that in turn calls 708 user supplied Entry routine” in column 6, lines 46-51), adding an entry in a function lookup table of the original function (“insertion of the demultiplexor entries 510. A demultiplexor entry (demux-entry) is provided for each target routine.” in column 5, lines 46-51 and lines 64-67), determining if the prototype of the original function is correctly specified and indicating an error when the determining indicates an incorrectly specified prototype of the original function (“The routines also allow the function of a target routine to be fully replaced such that newly provided code will be executed instead of the base code in the routine being monitored.” in column 4, lines 62-65, inherently determining prototype). Fortin does not explicitly teach an imported function, a stub function for the imported function, and adding a wrapper of the imported function to an import data block. Official Notice is taken that it was a common practice to include a stub function for an imported function at the time the instant invention was made. Peek teaches adding a wrapper of a function to a data block (“providing a “wrapper” for the particular function ... a wrapper will be seen to be an individual piece of code

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placed around a corresponding individual function call or routine" in column 6, lines 34-37 and 43-50).

It would have been obvious to one having ordinary skill in the computer art at the time of the invention was made to modify the method disclosed by Fortin to include a stub function for an imported function and adding a wrapper of the imported function to an import data block using the teaching of common practice and Peek. The modification would be obvious because one of ordinary skill in the art would be motivated to eliminate recompilation of a file and to encapsulate data.

Per Claims 23-25:

Fortin teaches a computerized method for instrumenting an original function in an executable file for testing by callers of the original function ("provide a system and method for efficiently instrumenting stripped object routines executing on a computer system" in column 3, lines 19-21), adding an entry in a function lookup table of the address of the original function ("insertion of the demultiplexor entries 510. A demultiplexor entry (demux-entry) is provided for each target routine." in column 5, lines 46-51 and lines 64-67), redirecting is accomplished by an instruction that causes a jump to the user-supplied function ("Processing begins with a call to the target routine 702. This call will encounter the branch first instruction and immediately branch to the Entry section 704 ... that in turn calls 708 user supplied Entry routine" in column 6, lines 46-51), determining whether the prototype of the original function is correctly specified, and indicating an error when the determining whether the prototype of the original function is correctly specified indicates an incorrectly specified prototype of the original function ("The

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routines also allow the function of a target routine to be fully replaced such that newly provided code will be executed instead of the base code in the routine being monitored.” in column 4, lines 62-65, inherently determining prototype). Fortin does not explicitly teach an embedded function and redirecting an embedded function to the wrapper. Official Notice is taken that it was a common practice to include an embedded function at the time the instant invention was made. Peek teaches redirecting a function to the wrapper (“providing a “wrapper” for the particular function ... a wrapper will be seen to be an individual piece of code placed around a corresponding individual function call or routine” in column 6, lines 34-37 and 43-50).

It would have been obvious to one having ordinary skill in the computer art at the time of the invention was made to modify the method disclosed by Fortin to include an embedded function and redirecting an embedded function to the wrapper using the teaching of common practice and Peek. The modification would be obvious because one of ordinary skill in the art would be motivated to encapsulate functions.

Per Claim 26:

Fortin further teaches that the function lookup table is in the executable file (column 5, lines 46-51).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


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15. Any inquiry concerning this communication from the examiner should be directed to Qamrun Nahar whose telephone number is (703) 305-7699. The examiner can normally be reached on Mondays through Thursdays from 9:00 AM to 6:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki, can be reached on (703) 305-9662. The fax phone number for the organization where this application or processing is assigned is (703) 746-7239.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

QN
January 9, 2003



TUAN Q. DAM
PRIMARY EXAMINER